

UTC Incident Investigation Form

Notification ID:	3523	Investigation ID:	7974
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Inspector Name:	Dennis Ritter
Date Report Submitted to Chief Engineer:	7/30/2019
Date Report Reviewed & Approved by Chief Engineer:	8/19/2019

Operator:	Tidewater Terminal Company
District/Unit:	Snake River Terminal
Location:	Pasco, WA
Incident Date:	6/2/19

Description:
<p>A Tidewater Terminal Company (Tidewater) seasoned employee turned a thermal relief to the closed position during receipt of transmix into a tank at the Snake River Terminal (SRT). The employee forgot to turn the thermal relief back into the on position after the receipt and failed to notify the oncoming shift of the relief in the closed position. The result was an exceedance of the maximum operating pressure (MOP) of 285 psi. The pipeline reached 384 psi. This event qualifies as a safety-related condition per 49CFR 195(a)(4) and requires PHMSA notification. This report summarizes the investigation into the cause of the incident.</p>

Facts/Chronology of Events:
<ul style="list-style-type: none"> According to Tidewater records, employees involved were OQ qualified to operate the pipeline which includes responding to abnormal operating conditions. Based on findings from UTC's 2018 audit, Tidewater re-trained employees on how to respond to abnormal operating conditions (AOCs) per their procedure SOM 5.0. <p>June 2, 2019 18:00-Karen Scott and Robbie Berry came on duty for a 12-hr night shift. Note Employee Scott is the OQ'd operator in charge of the pipeline. Berry is in training.</p> <p>2:13-Scott and Berry prepare to receive a shipment of unleaded gasoline (IB #6619). Valves were aligned to flow unleaded gasoline into Tank 28. Note: this receipt had a small portion of unleaded, then approximately 4700 gallons of transmix, then the bulk of the unleaded. The transmix must be transferred into Tank 7 which requires valves to be realigned.</p>

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2:23-Approximately 10 minutes after receiving the initial batch of unleaded, employee Scott made the valve switch to send transmix into Tank 7. She also turned the thermal relief valve, which protects this portion of above ground piping, to the closed position. Since 2014 when Tidewater began accepting transmix, this protocol to turn off the thermal relief has been a "standard practice". The reason given by personnel as to why they close the relief valve is because sending product from the inbound gasoline line which is 6", to the transmix line, which is 4", increases the line pressure above the set point of the thermal relief which is 40 psi (can reach approximately 51 psi). When that happens, the valve opens and product is released into a half-inch pressure relief line. This line relieves around the block isolation valve into the unleaded inbound line. To prevent contaminating the unleaded gasoline with transmix, employees developed a work around--closing the thermal relief during receipt operations involving transmix.

2:47-Employee Scott switched valves back to allow unleaded gasoline to flow back into Tank 28. Employee Scott stated she forgot to turn the thermal relieve back to the open position. Employee Berry did not notice the thermal relief remained closed off.

6:00-Shift change occurs. Employees Scott and Berry hand off to employees Billy Thomas and Ethan Ireland. The unleaded gasoline transfer is still occurring through the shift change. Employees Thomas and Ireland are advised of this, but no mention of the thermal relief being in the off position.

10:18-Employee Thomas shuts down inbound pipeline as they had finished receipt of unleaded gasoline into Tank 28.

10:30 approx-Thomas gauges the tank to verify receipt volume (4.3.1 SOM).

11:14-First alarm occurred indicating a problem with the inbound pipeline (flow or pressure). Blue strobe with audible alarm. (Blue is for pipeline)

11:15-Employee Ireland, at the Dock office, acknowledges the alarm and it "disappears". Employee Thomas is not in the office when this occurs. Ireland notes, there was no record of the alarm recorded or visible on the SCADA screen at the Dock office. Ireland calls Thomas (Billy Thomas is the OQ'd employee in charge of the pipeline, Ireland is OQ qualified to operate the pipeline, but is not the operator in charge). Arriving at Dock office, Employee Thomas checks the screen and sees no alarm recorded or banner on screen and believes it to be a "blurb" a "ghost alarm" (apparently, several years ago there had been issues with the flow module at Tesoro/Andeavor giving an alarm when there was none). Employee Thomas indicated this must be the case as a real alarm cannot be "reset" until the condition causing the alarm is rectified. So if the alarm went away must be some transient event.

12:30-second alarm with blue strobe and audible alarm indicating pipeline issue. Again, from the Dock office, Employee Ireland silenced the alarm. This time Thomas is in the office and notes the alarm just went away, no history recorded. Again, he stated that if it were a real alarm, cannot

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make the alarm go away by acknowledging; it will keep coming back as long as the alarm condition exists. These alarms did not come back, so must be a "ghost". Thomas noted to Ireland he would check the Tank Farm SCADA panel when he did his routine checks later that afternoon. Neither of these employees checked pipeline parameters, pressure, flow and temperature at the Dock office which they could do with a simple touch of the screen. Employees also did not physically inspect the pipeline to see if there was an issue.

16:20 approx-Thomas doing routine tank checks looks at SCADA panel in Tank Farm and sees alarm banner. Because the alarm is on the inbound line from Tesoro/Andeavor, and Tidewater is shut in, he believes it to be an issue on the Chevron side of the pipeline.

16:30 approx. Employee Thomas then notices the thermal relief was in the closed position (Tank farm SCADA panel is immediately adjacent to this thermal relief). Employee Thomas opens the relief and it immediately starts relieving. To help relieve pressure in a timely manner, he also "cracked" the mainline block valve for a few minutes. After several minutes, he closes mainline block valve.

16:35-Employee Thomas continues with routine tank checks. Employee Thomas has been an employee with Tidewater for 29 years and an operator for 25. Stated he has never in that time received an alarm on the inbound pipeline in static conditions (that is, when pipeline is shut in).

18:00-Shift change. Hand off to employees Damon Remus and Robbie Berry. Employee Remus is OQ'd operator in charge of pipeline. NOTE: As a routine part of the shift change (4.2.5 SOM), the outgoing operator checks the trend logs (a running graphic history) for any discrepancies in pressure, flow or temperature over the previous 5 days. Employee Thomas forgot to make this check prior to shift change.

June 3, 2019

5:30-Employee Remus looks at trend logs prior to shift change and notices pressure spike from June 2, 2019. Spike was 384 psi. MOP of the line is 285 psi (basis on ANSI Class 150 flanges). Note: this exceeds 110% of the MOP and therefore is a safety related condition reportable to PHMSA per 49CFR 195.55.

6:00-Shift Change. Hand off to Karen Scott and Ethan Ireland. Remus notifies Employee Scott about pressure spike and asks her to tell Ron McClary (Maintenance Supervisor) there was a pressure spike. Employee Remus did not call McClary.

6:00-Employee Scott called employee Thomas and left message asking if she had forgot to open thermal relief. Employee Scott then called Employee Ireland and did reach him. Ireland informed her that she had left valve off and that Employee Scott had opened it at approximately 16:30 on June 2, 2019.

9:00-Employee Scott told Supervisor McClary about pressure spike found by Employee Remus and that it was probably on the Andeavor side due to the anomalous alarms received by Employee's Thomas and Ireland the day before.

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9:15-Employee Scott, called Supervisor McClary and indicated to him that she forgot to open thermal relief valve after receipt of transmix the night before and that pressure spike was probably not on Andeavor side.

9:15-Supervisor McClary initiates an investigation into cause of pressure spike.

June 10, 2019

13:18-Tidewater's Josh Jarman (Quality and Compliance Manager) calls UTC directly and leaves message for Dennis Ritter to report safety related condition (SRC) occurrence and asks for clarification on reporting.

20:58-UTC's Dennis Ritter listens to voice mail and then emails Jarman giving him information on how to report SRC.



Figure 1 Location of SCADA Panel in Tank farm in relation to thermal relief on Tank 7 transmix line

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Figure 2 Thermal relief on transmix line-shown locked open note-there was no lock previous to the incident.

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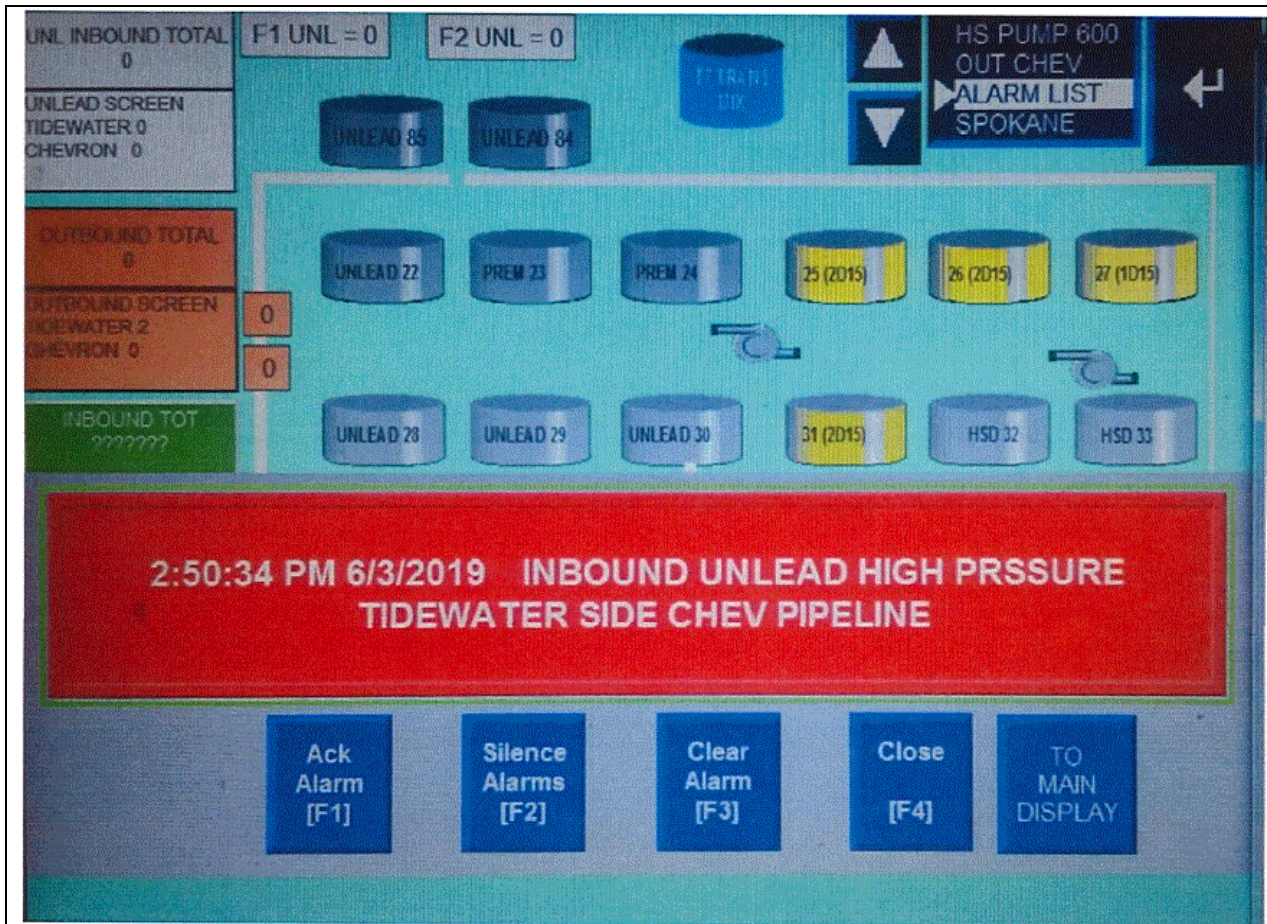


Figure 3-Tank Farm SCADA panel display showing alarm banner

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Alarm time	Acknowledge time	Message
* 6/4/2019 7:39:58 AM	6/4/2019 12:43:09 PM	BARGE PIT ALARM
* 6/4/2019 7:35:32 AM	6/4/2019 12:43:09 PM	TANK 32 HIGH
* 6/4/2019 7:35:32 AM	6/4/2019 12:43:09 PM	TANK 32 HIGH HIGH
* 6/4/2019 7:29:43 AM	6/4/2019 12:43:09 PM	TANK 25 HIGH
* 6/3/2019 2:58:10 PM	6/3/2019 5:23:12 PM	INBOUND UNLEAD HIGH P ²
* 6/3/2019 2:56:31 PM	6/3/2019 5:23:11 PM	INBOUND UNLEAD HIGH P ²
* 6/3/2019 2:50:21 PM	6/3/2019 2:54:25 PM	INBOUND UNLEAD HIGH P ²
* 6/2/2019 3:35:46 PM	6/3/2019 4:12:48 PM	INBOUND UNLEAD HIGH P ²
* 6/2/2019 2:10:48 PM	6/3/2019 4:12:48 PM	INBOUND UNLEAD HIGH P ²
* 6/2/2019 2:50:39 AM	6/2/2019 2:57:27 AM	TANK 84 HIGH HIGH
* 6/2/2019 2:50:37 AM	6/2/2019 2:57:27 AM	TANK 84 HIGH
* 6/2/2019 2:50:22 AM	6/2/2019 2:57:27 AM	TANK 85 HIGH
* 6/2/2019 2:50:22 AM	6/2/2019 2:57:27 AM	TANK 85 HIGH HIGH

Figure 4 Tank Farm SCADA display showing high pressure alarm (not the yellow alarm highlighted)

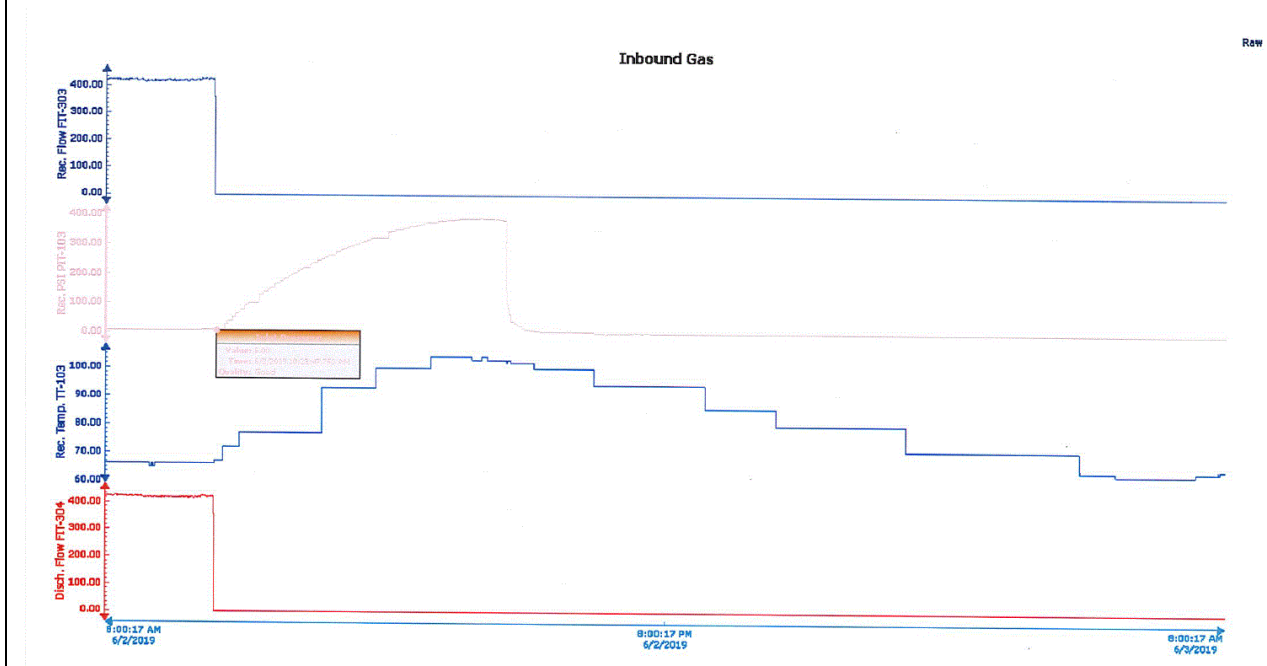


Figure 5 Alarm log and pressure graph

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Causes/Contributing Factors:

- 1) Based on interviews with Tidewater employees involved in the over pressure event, it appears the root cause of the incident was an operational culture which allowed an employee to close a critical safety device without any approval or oversight. In fact, this practice was known to all the operators as it has been regularly used since approximately 2014 when Tidewater started receiving transmix. Kelly Harding, Operations Manager (Note Mr. Harding was recently promoted to this position and used to be an operator) regarding this operating practice, Employee Harding indicated that he too had known about this work around and usually didn't close the valve as the amount of transmix moving through the half-inch line was minimal and would never be an issue to the quality control of the gasoline.

One employee stated in response to a question about whether the thermal relief needing to be closed to receive transmix had been brought up previously to supervisors, stated, that yes, he believed so, but couldn't remember if it was a safety meeting or other venue.

Given the years this practice has been employed, it would seem management knew or certainly should have known (Mr. Harding is now on the management side) about this practice and allowed it to continue.

- 2) Tidewater operator's failed to recognize the thermal relief was closed after receipt of the transmix was completed. Tidewater's procedure on "Receiving Transmix" does not mention closing the thermal relief as part of the procedure. This was a work around operators used to avoid contaminating unleaded gasoline with transmix.
- 3) The Tidewater SCADA computer console at the Barge office did not display alarms the same way the SCADA panel in the tank farm did. When employees Ireland and Thomas acknowledged the over pressure alarm, it "disappeared" from the screen and the audible alarm and strobes quit. According to Ireland and Thomas, there was also nothing in the history log indicating an alarm had occurred even though the alarm condition was still present (unbeknownst to them). The system should have continued to alarm with the alarm banner across the screen "latched" until the alarm condition was corrected. This was the case on the SCADA panel in the tank farm, where the banner was still on the screen when employee Thomas checked it approximately 6 hours after the first alarm. Had the alarm condition persisted on the SCADA monitor in the Barge office, it is highly likely employees would have responded differently and the condition corrected in a much more timely. Additionally, it was noted that the timestamp shown on the history in the panel display in tank farm was incorrect.
- 4) The Tidewater SCADA system received an over pressure alarm at approximately 11:14 and a second alarm at 12:30 pm. The Barge SCADA computer didn't record the overpressure alarm as it should have. However, any alarm on the pipeline must be considered an abnormal condition. Employees did not respond to the alarm (or the

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second alarm) by physically inspecting the pipeline or alert the Tidewater Manager on call per procedures (SOM 4.2.6 and 5.2)

5)

Regulatory Analysis/ Violations:

The following documents were reviewed during the course of this investigation:

- Operator Qualifications
- Operator logs
- Alarm history and graphs
- Training records
- Responses to previous WUTC inspections (specifically 2018 finding on how employees respond to AOCs)
- P&ID drawings
- Tidewater Pipeline Operations & Maintenance Manual (Rev 19)
- Tidewater Operational Procedures
- System Operations Manual-SRT Inbound Outbound Pipelines (Rev 3)
- Maintenance records for over pressure safety related devices-thermal reliefs

The following codes and regulation were reviewed as part of this investigation:

- WAC 480-75
- 49 CFR 195

Findings and conclusions:

- 1) Tidewater exceeded the maximum operating pressure of its pipeline when an employee closed a critical safety device (thermal relief valve) during a normal receipt of transmix. The MOP is 285 psig, and the pipeline reached 284 psig.
Violation-WAC 480-75-320/49 CFR 195.406
- 2) Tidewater does have a procedure for receipting transmix (approved 2/6/2018). The procedure doesn't mention the closing of the thermal relief valve PSV 1. Employees have been violating this procedure since its approval in early 2018, however this has been the standard practice of the operators conducting this task since 2014. This condition should have been recognized and discussed during the drafting of the procedure and the condition alleviated.
Violation-WAC 480-75-660 Procedural Manual for operations, maintenance, and emergencies
- 3) The current transmix receipt procedure requires two operators to perform this procedure and for both to walk the transmix line and verify alignment both before and after receipt. As the thermal relief in question protects and is on the transmix line valve which must be aligned (open or closed), it appears that the operators didn't walk the line after receipt or simply failed to recognize the handle position of the ball valve in the off position on the thermal relief.
Violation-WAC 480-75-660 Procedural Manual for operations, maintenance, and

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emergencies

- 4) It was also noted that there was not a procedure which explains critical safety devices and how they are viewed operationally--there is no procedure indicating who has the authority and under what circumstances one of these devices can be taken out of service (turned off). If the device is necessary for the safe operation of the pipeline, under no circumstances should it be closed off during normal operations.

Violation-WAC 480-75-660 Procedural Manual for operations, maintenance, and emergencies

- 5) The Tidewater SCADA system received an over pressure alarm at approximately 11:14 and a second alarm at 12:30 pm. The Barge SCADA computer didn't record the overpressure alarm as it should have. However, any alarm on the pipeline must be an abnormal condition. Employees did not respond to the alarm (or the second alarm) by physically inspecting the pipeline or call the Tidewater Manager on call per procedures (SOM 4.2.6 and 5.2).

Violation-WAC 480-75-660 Procedural Manual for operations, maintenance, and emergencies

- 6) Employee Thomas noting the pressure relief was in the closed position, opened it and began pressure began relieving. Employee Thomas should have recognized this as an abnormal condition and the Tidewater Manager on call should have been alerted.

Violation-WAC 480-75-660 Procedural Manual for operations, maintenance, and emergencies

- 7) Tidewater did not have annual maintenance records for the thermal relief which was turned to the closed position and subsequently began relieving when opened (PSV1).

Violation-WAC 480-75-600 Maps, drawings, and records of hazardous liquid facilities

Follow up/ Recommendations:

Follow up:

- 1) Tidewater must immediately inspect all portions of the inbound gasoline line to ensure no damage occurred from over pressuring the pipeline. Tidewater must also perform a stand up test on the inbound gasoline line to ensure no leaks in the pipeline due to over pressuring the pipeline.
- 2) Tidewater must immediately prepare and implement a procedure to ensure critical safety devices cannot be turned off during normal pipeline operations and further, define under what conditions and management authority they are allowed to be closed off. All personnel must be trained on the procedure.
- 3) Tidewater must immediately investigate the reason why employees are turning off a critical safety device during routine operations in order to receive transmix into Tank 7. A management of change process should follow the investigation to implement changes to the procedure to allow receipt without turning off a thermal relief. All personnel must be

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trained on the procedure. The investigation should document the proper set point on the thermal relief devices based Tidewater operations, material limits etcetera. Tidewater must document any changes and noted on appropriate drawings or other facility records where employees can access them for operating the pipeline.

- 4) Tidewater must immediately fix/repair the SCADA computer logic at the Barge office to ensure alarms are properly displayed and logged to ensure proper response by Tidewater personnel. All personnel must be trained on the changes to the system. Additionally, the historian time log of events must be correct and therefore the actual time must be correct in the SCADA logic.
- 5) Tidewater must review, with all operators, the current procedures for responding to abnormal operating conditions (including alarms) and the appropriate response expected by Tidewater management. All necessary changes must be documented and employees trained accordingly.
- 6) Per 49 CFR 195.428, Tidewater must immediately inspect PSV 1 (and any other thermal relief with deficient documentation) and any defective device must be repaired or replaced. All inspections must be documented appropriately.